

photosensitive material, wherein a color pattern of plane characters or images and a color three-dimensional subject image are reconstructably recorded therein while a reconstructed image of the plane pattern differs depending on height from the hologram surface.

8. (Three times amended). A process of fabricating a color hologram display, comprising recording a color three-dimensional subject image and a color pattern of plane characters or images as hologram images by exposing said subject image and said color pattern of plane characters to light and recording the interference pattern thereof in the same photosensitive material.

REMARKS

Reconsideration is respectfully requested.

Claims 1-18 are pending in this application.

The Examiner has objected to the amendment of claim 1 introduced in the response to office action filed October 28, 2002, for allegedly introducing new matter into the disclosure. Claim 1 as amended includes the phrase "multilayer hologram". The Examiner alleges this is not supported in the specification, and states "A single hologram in a multilayer is not possible in the art."

The Examiner also rejects claims 1-7, 14, and 17-18 under U.S.C. §112 first paragraph as containing subject matter which is not described in the specification in such a way to reasonably convey to one skilled in the art that the inventor, at the time

the application was filed, had possession of the claimed invention. Also, the Examiner rejects claims 1-14 and 17-18 under U.S.C. §112 second paragraph as being indefinite. The §112 second paragraph rejection is a reiteration of the Examiner's Rejection of claims 1-18 in the office action dated April 26, 2002. The Examiner alleges it is not clear if the combination means the combination between reflection and volume type or the combination between the color pattern of the plane characters or image and three-dimensional subject image.

Applicants respectfully believed the amendment herein to claim 1 should resolve the concerns raised by the Examiner, and it is respectfully requested that the above rejections be withdrawn. It is noted, however that "combined" meant a combination of a three dimensional image hologram with a plane pattern image hologram.

The Examiner has also rejected claims 1-3 under 35 U.S.C. §103(a) as being unpatentable over Waitts U.S. 5,956,164. The Examiner alleges Waitts teaches that graphical material with the combined holographic areas (12, 14, and 16), each contain a hologram, and the diffraction grating areas (24, 26, and 28) renders obvious providing a plane character or image on other that the surface of the hologram obvious (FIG. 1).

Applicants respectfully traverse.

Waitts teaches a combination of the plane pattern diffracting grating with a relief hologram. The Examiner asserts that both are reconstructed at different positions on the

hologram surface. We admit that both may be reconstructed at different positions on the hologram surface, and both may be displayed by area dividing in an overlapping fashion.

However, the diffraction grating controls only the direction of diffraction to reconstruct a plane pattern in rainbow colors. However, it is impossible with the teaching or suggestion of Waitts to reconstruct a plane pattern in a height direction as in the present invention. Applicants therefore respectfully traverse the rejection.

Waitts teaches something very different from Applicant's invention as disclosed and claimed. Waitts teaches a graphic material having an area with a hologram which is over stamped in parts with a diffraction grating microtexture.

The diffraction gratings on the surface of waitts' material do not exhibit parallax when viewed, and create blanks, or missing, portions in the holographic area. Waitts' 3D subject exhibits parallax as a single image as in any standard hologram, but the diffraction gratings obstruct the view of the 3D image. Viewing a hologram is often compared to looking at an object through a window. Waitts' hologram is like looking at an object through a window which has a rainbow designs, or shapes, painted on, or scratched into, the surface of the glass. Extending the analogy further, and borrowing from Waitts' disclosure, the rainbow designs on the window would catch the attention of a passerby to step up to the window to look out and see the image on the other side. Waitts' discloses in Column 4, lines 40-47:

"... a potential two step process of appreciation; namely, the bright and colorful rainbow effect produced by the diffraction grating indicia catches an observers eye, whereupon the observer then seeks to examine the product further and views it from various angles, thereby becoming aware of the three-dimensional images produced by the holographic indicia."

In contrast, and further extending the analogy, Applicant's inventive hologram is like looking through a window to see a plane character, like a 2D sign on the other side of, and spaced away from, the window which exhibits parallax as the viewer shifts his line of sight. And the viewer sees a 3D character on the other side of the window which also exhibits parallax. The character image and the subject image also exhibit parallax relative to each other. The presence of the two different images, of two different image types, makes a much more interesting experience for the viewer. The more interesting image is only possible with applicant's invention. The skilled artisan with Waitts' disclosure before him would not learn to make an image as complex and interesting as that provided by Applicant.

The Examiner states "Waitts teaches particularly that the visual images of the holograms and the diffraction gratings may be overlapping with each other. Since the hologram images are three-dimensional images and the diffraction images are two-dimensional images such overlapping implies that the two images will not be at one surface."

Applicants respectfully should point out the following:

Column 6 of Waitts at line 9 describes "FIG. 6 shows an apparent overlap of diffraction grating area 326 and holographic area 312." Waitts is merely describing abutting areas. There can be no visual overlay or stacking in an axis normal to the material. In Column 6 at lines 26-28, Waitts goes on to describe "the overlay is an implied visual effect rather than an actual physical construction" and Column 6, lines 29-33, "a diffraction grating precursor could cover the indicia area of the blank 54 in a first step whereupon an over stamping of a hologram microtexture having voids corresponding to the shape of the diffraction grating areas 526". The voids and the diffraction gratings are on the surface of the material. The eye must be moved to look past the gratings to see the 3D image behind, and the gratings stay in the same place on the material surface.

Claims 8-13 are rejected under 35 U.S.C. §112 second paragraph. The Examiner still alleges claim 8 fails to provide steps for actually recording the subject image and a color pattern of the plane characters or image. And that the process of recording either holographically or an embossing method should be stated. Claim 8 is amended herein, and it is believed that the rejection should be withdrawn.

The Examiner stated in the Office Action dated April 26, 2002 that claims 9-13 inherit the rejection to claim 8. Since claim 8 is believed to be in condition for allowance, claims 9-13 are also believed to be in condition for allowance since they depend from claim 8. It is believed the specific issues raised

by the Examiner with regard to claim 10 have been addressed in the last amendment.

The Examiner has rejected claims 4-7, 14 and 18 under 35 U.S.C. §103(a) as being unpatentable over Waitts as applied to claims 1-3, and further in view of Cowan U.S. 4,888,260. Applicants respectfully traverse. It is believed the Examiner's rejection as applied to claims 1-3 have been overcome in view of the discussion of the differences between the applicants' invention and Waitts' disclosure. Since claims 4-7, 14 and 18 depend from a base claim believed to be in condition for allowance they are also believed to be in condition for allowance.

The Examiner has rejected claims 8-13 and 15-18 under 35 U.S.C. §103(a) over Waitts in view of Cowan. Paragraph 12 of the present action reiterates the Examiner's rejections from the April 26, 2002 action. Stating that Waitts has combined holographic area and diffraction area, and that "the phrase "volume type" is [used to] refer[red] to hologram/grating[s] having a ratio for the fringe size of the hologram/grating to the layer thickness[that] satisfies certain criterion."

Applicants respectfully traverse. Applicants agree with the Examiner only to the extent that diffraction gratings can be created in a volume hologram emulsion by recording the interference pattern of two beams of coherent light with no obstacles involved, i.e. no light is reflected off an object. However, Waitts' device embosses a diffraction grating on the

surface of the material. A volume hologram has diffractive and refractive effects which extend throughout the emulsion.

With regard to paragraphs 13 and 14 of the action, applicants respectfully believe that the above comments and remarks overcome these paragraphs.

Applicants therefore respectfully submit that the application is allowable.

A notice of appeal is submitted concurrently, to maintain the application pending while the Examiner considers this response.

No amendment made was related to the statutory requirements of patentability unless expressly stated herein. No amendment made was for the purpose of narrowing the scope of any claim, unless applicants have argued herein that such amendment was made to distinguish over a particular reference or combination of references.

In light of the above noted amendments and remarks, this application is believed in condition for allowance and notice thereof is respectfully solicited. The Examiner is asked to contact applicants' attorney at 503-224-0115 if there are any questions.

Respectfully submitted,



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MARKUPS

1. (Three times amended) A color hologram display comprising a [combined] reflection and volume [type of] hologram of a single layer [hologram or multilayer hologram] photosensitive material, wherein a color pattern of plane characters or images and a color three-dimensional subject image are reconstructably recorded therein while [spatially superposed one upon another, and wherein the plane character or image is on other than a surface of the hologram] a reconstructed image of the plane pattern differs depending on height from the hologram surface.

8. (Three times amended) A process of fabricating a color hologram display, comprising recording a color three-dimensional subject image and a color pattern of plane characters or images as hologram images by exposing said subject image and said color pattern of plane characters to light and recording the interference pattern thereof in the same photosensitive material.